ELECTRICAL DEVICE FOR ADJUSTING THE ANGLE BETWEEN A TOP MODULE AND A BOTTOM MODULE

BACKGROUND OF INVENTION

1. Field of the Invention

The present invention relates to an electrical device, and more specifically, to an electrical device that forms a specific angle between a top module and a bottom module as the top module is unfolded.

2. Description of the Prior Art

With the popularization of convenient mobile phone devices for routine communication among people in the modern information society, people are able to exchange information, sharing experiences and communicating with each other anywhere and anytime. Conventional mobile phones have integrated more and more functions, such as listening to broadcasts, playing games, taking photos, and receiving electronic mail and SMS messages. In other words, mobile phones are not just communication tools but also portable electronic devices with multiple functions.

Please refer to FIG. **1**, which is a diagram of the mobile phone **10** according to prior art. The mobile phone **10** contains a top module **12** having a display panel **11** for displaying images, a bottom module **14** having a plurality of buttons **18** for controlling the operation of the mobile phone **16**, and a connection device **16** for rotatably unfolding the top module **12** and the bottom module **14** by the angle of 180 degrees between the top module **12** and the bottom module **14** as shown in FIG. **1**. Because the aspect ratio of length to width for images displayed by the display panel **11** in the condition which FIG. **1** illustrates is 16:9 (or 4:3), that is, the width is narrower, it is desirable to be able to rotate the mobile phone **10** to another orientation so that the aspect ratio of length to width for images displayed by the display panel **11** is 9:16 (or 3:4). It is more suitable for a user to read text, for example electronic mail, in such a display image ratio. It is not ergonomically suitable for a mobile phone to have an included angle of 180 degrees between the top module **12** and the bottom module **14**. For that reason, it is desirable to improve the mobile phone.

SUMMARY OF INVENTION

It is therefore a primary objective of the claimed invention to provide an electrical device that not only allows the top module to rotate relative to the bottom module around two different axes, but also to set the included angle between the top module and the bottom module to be around 160 degrees to suit the ergonomics of a mobile phone when the top module has been opened.

According to the claimed invention, an electrical device comprises a top module having a panel for displaying an image, a bottom module having a plurality of buttons for controlling the operation of the electrical device, a base affixed on the bottom module, a pivot formed on the base having a buckle for buckling the top module which is capable of rotating around the buckle, a stop block for stopping the top module, and a track surrounding the base for allowing the stop block to move along the track.

These and other objectives of the present invention will no doubt become obvious to those of ordinary skill in the art after reading the following detailed description of the preferred embodiment that is illustrated in the various figures and drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a diagram of a mobile phone according to the prior art.

FIG. **2** shows a mobile phone according to the present invention.

FIG. **3** is a diagram showing the top module of the mobile phone rotated 90 degrees around the axis indicated by the arrow B.

FIG. **4** is a structural diagram of the connection device depicted in FIG. **2**.

FIG. **5** is a diagram showing the connection device in FIG. **4** after moving along the track.

FIG. **6** and FIG. **7** are diagrams showing the top module and the bottom module in relation with the connection device.

DETAILED DESCRIPTION

Please refer to FIG. **2** and FIG. **3**. FIG. **2** shows a mobile phone **50** according to the present invention. FIG. **3** is a diagram showing the top module **52** of the mobile phone **50** after being rotated 90 degrees around the axis indicated by the arrow B shown in FIG. **2**. The mobile phone **50** contains a top module **52** having a panel **42** for displaying an image, a bottom module **54** having a plurality of buttons **44** for controlling the operation of the mobile phone **50**, and a connection device **56** for coupling the top module **52** to the bottom module **54**. The included angle between the top module **52** and the bottom module **54** will be 160 degrees after the top module **52** rotates along the arrow A shown in FIG. **2**. Then, the top module **52** can be rotated 90 degrees around the axis indicated by arrow B to the position shown in FIG. **3**. As shown in FIG. **3**, the mobile phone **50** further comprises a pivot protection cover **180** for enclosing the components in the connection device **56** to protect the components from dirt or outside damage and for aesthetic reasons. For simplicity and clarity, the pivot protection cover **180** is only shown in FIG. **4**.

Please refer to FIGS. **4**–**7**. FIG. **4** is a structural diagram of the connection device **56** depicted in FIG. **2**. FIG. **5** is a diagram showing the connection device **56** in FIG. **4** after moving along the track **66**. FIG. **6** and FIG. **7** are diagrams showing the top module **52** and the bottom module **54** in relation with the connection device **56**. The connection device **56** contains a base **60** fixed to the bottom module **54**. The base **60** includes a pivot **62** with a first buckle **80** and second buckle **82** both for coupling the top module **52** to the pivot **62**. The top module **52** is able to rotate around the first axis **201** in the direction of arrow A. The pivot **62** includes a track **66** with one end substantially against the base and the other end rising to a height above the base of d. A stop block **68** is shidably installed on the track **66**. One end of a flexible component **70** (e.g., a spring) is connected to the stop block **68**, and the other end of the flexible component **70** is affixed to the rotation member **84** or to the pivot protection cover **180** (illustrated in FIG. **3**). One side of the top module **52** is engaged in groove **72** on the stop block **68** while the top module **52** rotates in the direction of arrow A in FIG. **2**, that is, the included angle between the top module **52** and the bottom module **54** will be 160 degrees (as shown in FIG. **6**). As the top module **52** rotates around the second axis **202** in the direction of arrow B, it also rotates the rotation member **84** around the second axis **202** in the dircetion of arrow B, and the stop block **68** connected to the track **66** will slide along the path of the track **66** to the position shown in FIG. **5** due to the force exerted by the flexible component **70**